

1 WHAT IS CLAIMED IS:

2 1. A differential limiting control apparatus for a four  
3 wheel drive vehicle having clutch means for variably transmitting  
4 a driving force to a front drive shaft and to a rear drive shaft,  
5 comprising:

6 automatic clutch control means for automatically  
7 calculating and establishing an engagement force of said clutch  
8 means according to traveling conditions of said vehicle;

9 manual clutch control means for manually establishing  
10 said engagement force of said clutch means; and

11 control selecting means for selecting either of said  
12 automatic clutch control means and said manual clutch control  
13 means and for commanding said selected one to output said engagement  
14 force.

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16 2. The differential limiting control apparatus according  
17 to claim 1, wherein, in an initial condition of an ignition switch  
18 turned on, said control selecting means command said automatic  
19 clutch control means to output said engagement force of said clutch  
20 means until said manual clutch control means is newly selected.

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22 3. The differential limiting control apparatus according  
23 to claim 1, wherein, when said vehicle travels at a higher speed  
24 than a threshold value, said control selecting means command said  
25 automatic clutch control means to output said engagement force

1 of said clutch means.

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3 4. The differential limiting control apparatus according  
4 to claim 1, wherein said automatic clutch control means include  
5 target differential rotation speed establishing means for  
6 establishing a target differential rotation speed between said  
7 front and rear drive shafts, actual differential rotation speed  
8 detecting means for detecting an actual differential rotation  
9 speed between said front and rear drive shafts, and clutch torque  
10 calculating and establishing means for obtaining deviations  
11 between said target differential rotation speed and said actual  
12 differential rotation speed and for calculating and establishing  
13 said engagement force of said clutch means by constituting a  
14 switching function using the polarity of an integral term of said  
15 deviations and by applying the sliding mode control.

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